II.—Note on certain Impressions of Echinoderms observed on the Sandstone Slabs in which the Skeletons of *Hyperodapedon Gordoni* and *Rhynchosaurus* are preserved.

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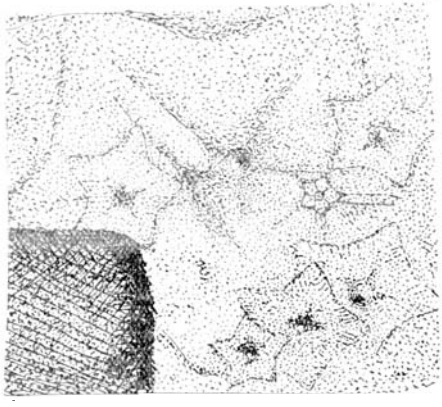
When searching for traces of the dermal structure preserved in the specimen of *Hyperodapedon* in the British Museum (Natural History) in London,[1] my attention was drawn to certain spots where the matrix showed projections and pits of a polygonal shape, which I detected when I took the photographs of this Triassic reptile. Primarily occupying myself with the matrix of the principal slab, in which the skeleton is enclosed, I quite thought I had only to deal with dermal structures similar to those discovered in *Rhynchosaurus*.

One of these spots, lying between the ninth and tenth ribs of the left side, particularly attracted my attention. This I was at first inclined to regard as a dermal ossification, the pentagonal character of which was unquestionable. On closer inspection I found, however, the whole of the matrix *densely covered with similar structures*, a circumstance which became still more perplexing in proportion as I discovered their immense numbers, which were equally abundant at a considerable distance from the body, and also in the matrix of the counterpart which had not been touched by the chisel. The matrix of the Rhynchosaurian fossils from Warwickshire also showed the same character; indeed, I found some on these slabs in even better condition of preservation.



Prints of Echinoderms in the Triassic Sandstones of Warwickshire and Elgin. From a specimen in the British Museum (Natural History). × 3.

Actual petrefactions they were not, but simply the hollow impressions leaving a film behind, between the coarse grains of the sand. In size they vary between 3 mm. and 3 cm. in diameter. The matrix is crowded with these bodies, which are deposited over each other, all of them lying in the same plane as the skeleton of

[1] See "On *Hyperodapedon Gordoni*": Geol. Mag., 1900, Nov. and Dec.

Hyperodapedon. Those facing the observer with their upper sides have left teat-like projections in the stone; others appear as funnel-shaped depressions made by a massive body.

In shape they are star-like pentagons, of about the same form as the bodies of Euryalidæ.

In diagonal opposition to the main portion of the star-shaped bed lies a small pentagonal plate consisting of five parts, which radiate from a central piece. I believe I have also detected some radiating striæ on the outer pentagon in a few exceptionally well-preserved examples, as well as some finer striæ, skirting the margin of the extreme pentagonal radially, where they arrange themselves in regular order. Besides these pentagons I noticed some series of smaller segments of about $\frac{1}{2}$ mm., which to the number of six unite with each other, though rarely more, in which latter case they are very difficult of detection.

The conclusions I have arrived at as to these structures, and to which I give expression quite reservedly to specialists engaged in this branch of geology, are as follows:—

These pentagonal forms are empty caverns left by Echinoderms of a Eurylaid shape, having peripheral arms, either simple or forked. To whatever group of Echinoderms they may belong will be a matter of investigation by specialists. Under no circumstances are they parts of *Hyperodapedon*. The two pentagonal sets of which they are composed, together with their projecting limbs, are forms which do not resemble any other type of the classes of invertebrates. In favour also of this inference is their enormous quantity and the great diversity in their sizes. The extreme delicacy of these impressions is probably the reason why my examination of the slabs did not yield a better result, as might have been the case if the stones had been more recently quarried or specially prepared for this purpose.

That no remains of their external skeletons are preserved, is in no way detrimental to this hypothesis, as a corollary to this is found in the case of those hollows left by Elgin reptiles, which E. T. Newton so admirably described from casts taken from their natural moulds. No other fossils having been found in these localities except reptiles, is also an argument in favour of such an interpretation as the above.

From a like presence of these casts in both localities, the Elgin sandstones, which Smith Woodward quotes as "supposed Trias," should be of the *same age* as the sandstones belonging to the Upper Triassic of Warwickshire and Shropshire.

Interesting as may be the task of pursuing this highly attractive geological question, it is a matter of real regret that I am compelled to deny myself the pleasure of conducting the investigation of this subject further. I must confine myself here to the statement only, that I have good reason for believing that I have observed similar petrefactions of organic origin in some rather imperfect fragments from the Maleri deposits in India.